Analysis of Self Concept and Graduation Capability in the Era of Industrial Revolution 4.0 to Increase Absorption of Vocational Student Graduates

Amat Mukhadis [1], Andika Bagus Nur Rahma Putra[2], Windra Irdianto[3], Affero Ismail[4], Fendi Achmad[5]

[1,2,3]Faculty of Engineering, Universitas Negeri Malang, Indonesia,
[4,5]Faculty of Electrical and Electronic Engineering, Universiti Tun Hussein Onn Malaysia, Malaysia
[*]andika.bagus.ft@um.ac.id

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Abstract: This study aims to: (1) map self-concept needs in the era of IR 4.0; (2) mapping the graduation capability needs in the era of IR 4.0; and (3) mapping the efforts of universities to increase the absorption of graduates of vocational students. The method used is a qualitative method. Data collection techniques with interviews, documentation, literature review, and observation. The research subjects included lecturers, students, and stakeholders. Data analysis techniques through data reduction, data interpretation and triangulation. Conclusions from this study indicate that: (1) the need for self-concept in the era of IR 4.0 in vocational students includes internal dimensions (the identity self, the behavioural self, the judging self), and external dimensions (physical self, moral ethical self, personal self, family self, social self); (2) the need for graduation capability in the era of IR 4.0 in vocational students includes speed in taking effective and appropriate actions, the ability to map the vision and mission of life, the ability to cooperate with everyone, being able to adapt to all conditions of the work environment; and (3) higher education efforts in the field of vocational education to increase the absorption of graduates of vocational fields including the application of the synchronized curriculum of DU / DI needs, expansion of the number and quality of vocational education institutions, cooperation with graduate users, development of tracer studies, and student entrepreneurship improvement.

1 INTRODUCTION

The phenomenon of the pace of industry which continues to experience accelerated developments now shows a high effect of futurism. At present the development of the industry is forced to merge with Industrial Revolution (IR) 4.0, so that all sectors are affected (Pieroni, Scarpato and Brilli, 2018; Rahman *et al.*, 2019; Zabidin, Belayutham and Ibrahim, 2019). Including the education sector to the work industry. Especially in the vocational education sector, the educational generation printer in this case the Higher Education must be able to synchronize the curriculum and system towards the virtual digitalization era. Some experts point out that currently vocational field graduates are still relatively difficult in finding work (Lang *et al.*, 2017; Loeb and Gustavsson, 2018; Lin, 2019; Woessmann, 2019). In 2015-2019 there were less than 60% of vocational graduates who got jobs in accordance with the competencies of their graduates.

It is a malignant disease that must be solved immediately. Indonesia, which is a country with a relatively large number of educational institutions, still cannot fully focus on accelerating the increase in absorption of graduates (Irdianto and Putra, 2016; Putra *et al.*, 2018; Suswanto *et al.*, 2018). The effect of this, new approaches and capabilities are needed to build innovative and attractive virtual digital systems. On such challenges, in the era of Industrial Revolution (IR) 4.0 generation printers such as require global scale innovation in presenting knowledge for their students (Jantan *et al.*, 2018; Mahmood and Hussin, 2018; Mukri and Anwar, 2019; Philbeck and Davis, 2019).

The phenomenon of the low absorption of graduates of vocational fields is a serious threat. Some experts revealed that the absorption of graduates of vocational fields is still influenced by the type of work trend (Yousaf, Ashfaq and Ahmad, 2018; Hashim *et al.*, 2019; Kintu, Kitainge and Ferej, 2019). This will certainly hamper the nation's

economy and be a degradation of the quality of vocational education. In the IR 4.0 era, the need for competent professionals was demanded to be sharper. On the other hand, this era is a process of economic change which is characterized by the increasing portion of the digital that replaces the role of humans and undermines conventional business people (Jantan *et al.*, 2018; Mahmood and Hussin, 2018; Philbeck and Davis, 2019; Vu and Le, 2019). This revolution happened along with the connection of all machines in the internet system or cyber system.

In IR 4.0 the emergence of supercomputers, smart robots, vehicles without drivers, genetic editing and the development of neurotechnology that allows humans to further optimize brain function to develop rapidly (Jose and Ramakrishna, 2018; Mahmood and Hussin, 2018; Zaharah *et al.*, 2018; Philbeck and Davis, 2019). In fact, the development of the education curriculum in higher education is not as fast as that acceleration. The President of the Republic of Indonesia explained that the Fourth industrial revolution has the potential to increase the level of global income and improve the quality of life for the world community (Irdianto and Putra, 2016; Putra, Mukhadis and Suhartadi, 2016; Putra *et al.*, 2019). The direct impact of this is that various industrial fields will produce cheap and competitive product prices and try to increase work efficiency and productivity. However, until now education in Indonesia is still burdened by the main problem of higher education in Indonesia, which is in the professional effort towards developing capabilities and self-concepts.

The role of universities as laboratories in creating a new generation is still too relatively slow (Journal and Journal, 2018; Newton *et al.*, 2018; Dang, Wang and Kang, 2019; Lin, 2019). So far, learning in higher education is still dominated by learning with verbal and classical systems, so that students use more passive and offline learning resources. This has a direct impact on the process of degradation of capabilities and self-concept massively. Capability is interpreted as the level of competence, skills, comprehensive knowledge, qualified skills, mastery of perfect management processes, good responsibility in the task, and the latest development of creativity in information. In addition, the meaning of self-concept consists of three forms. First, body image, which is awareness about his body and how one sees himself. Second, the idea of self, which is how one's dreams and hopes are about him. Third, social self, which is how other people see themselves. Based on that, capability and self-concept can be improved by efforts to make facilities for learning facilities and infrastructures, in this case learning resources (Karlsson, Nilsson and Nilsson, 2018; Haris *et al.*, 2019; Lin, 2019; Mesfin and Niekerk, 2019).

2 METHOD

The method used in this study is a qualitative method. This method was chosen because information is needed in relatively deep and complex information. Furthermore, the data collection techniques used are interview, documentation, literature review, and observation. The instruments used in this study were interview guides, questionnaires, and observation guidelines. In this study, the subjects of the study included lecturers, students, and stakeholders. Informants in this study included 50 lecturers in vocational education, 150 vocational students, 10 university stakeholders in East Java, and the provincial education office. In this study, data analysis techniques through data reduction, data interpretation and triangulation.
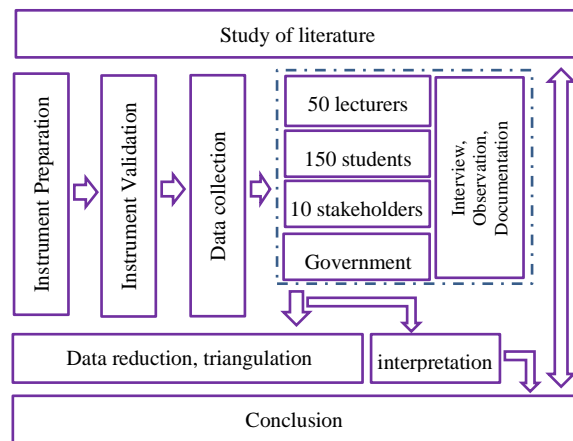

Figure 1: Research stage scheme

3 RESULT

In this study, several important things were found. This includes a map of needs from the aspect of aself concept, aspects of graduation capability, and the efforts of universities to increase the absorption of graduates of vocational fields. In the aspect of self-concept, the component of needs includes the internal dimension (the identity self, the behavioural self, the judging self), and the external dimension (physical self, moral ethical self, personal self, family self, social self). In detail, the percentage in each component of the need for the self-concept aspect is shown in Figure 2.
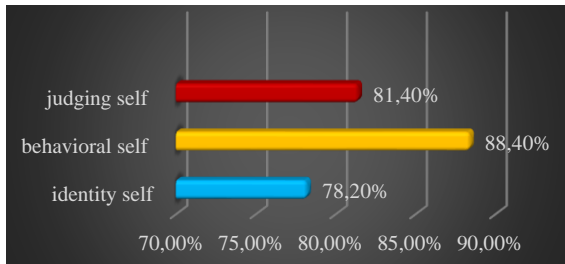
Figure 2: The percentage of each component needs in the aspect of the self concept internal dimension

In Figure 2, it is presented that on the internal dimension, the need for the ability of the self-concept aspect includes the identity of self, the behavioural self, the judging self. The percentage level in each need is the identity self of 78.2%, the behavioural self is 88.4%, and the self-judging is 81.4%. Furthermore, on the external dimension the needs of the self-concept aspect capability are shown in Figure 3.
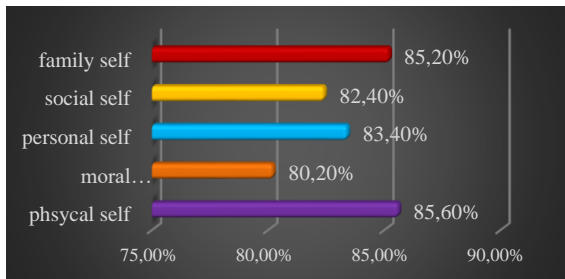

Figure 3: The ability needs of the aspect of the self-concept external dimension

In Figure 3, it is presented that on the external dimension, the ability needs of the self-concept aspects include physical self, moral ethical self, personal self, family self, and social self. The percentage level for each need is physical self at 85.6%, moral ethical self at 80.2%, personal self at 83.4%, family self at 85.2%, and social self at 82.4%. Furthermore, the percentage of graduation capability in the era of IR 4.0 in vocational students is shown in Figure 4.
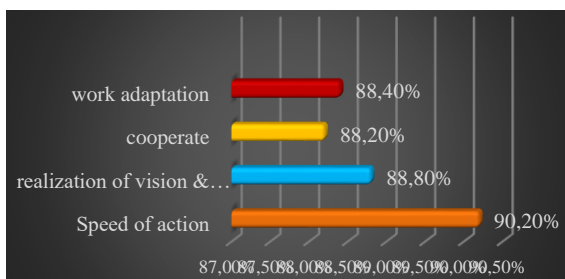

Figure 4: Percentage of graduation capability in the era of IR 4.0.

In Figure 4, it can be seen that there are four main capabilities needed in the graduation capability. The needs of these capabilities include speed in taking effective and appropriate actions, the ability to map the vision and mission of life, the ability to cooperate with everyone, and the ability to adapt to all conditions of the work environment. Percentage of each of these ability needs, namely speed in taking effective and appropriate actions at 90.2%, ability to map the vision and mission of life at 88.8%, the ability to cooperate with everyone at 88.2%, and adaptability to all environmental condition's employment of 88.4%. Furthermore, the efforts of universities in the vocational field to increase the absorption of graduates of vocational students are presented in Figure 5.
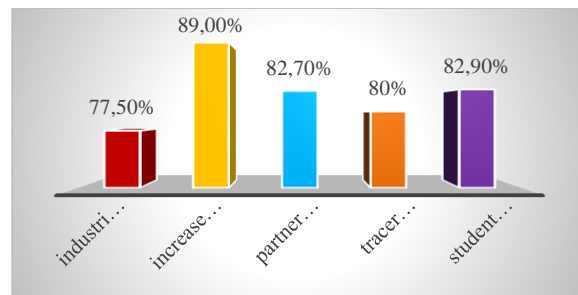

Figure 5: College business in the field of vocational education to increase the absorption of graduates

In Figure 5, it is presented that there are five main businesses of universities in the vocational field to increase the absorption of graduates of vocational students. These efforts include the application of the synchronized curriculum of DU / DI needs, expansion of the number and quality of vocational education institutions, cooperation with graduate users, development of tracer studies, and improvement of student entrepreneurship. The percentage of each business is the application of a synchronized curriculum for DU/DI needs of 77.50%, expansion of the number and quality of vocational education institutions by 89%, collaboration with graduate users of 82.70%, development of tracer studies at 80%, and student entrepreneurship increase of 82.90%.

4 DISCUSSION

This study highlights several important findings. There are three main topics as a result of the analysis of the findings of the research results. The discussion includes: (1) self-concept as the main need to face IR 4.0; (2) acceleration of graduation capability in era

4.0; and (3) increasing absorptive capacity of graduates in era 4.0.

4.1 Self-Concept as the main Component of IR 4.0.

In this study, it was revealed that in the concept of the concept there were two main needs needed to deal with IR 4.0. these needs are the needs of the internal dimensions and needs of the external dimension. In the internal dimension, needs include identity self, behavioural self, and judging self. On the external dimension the needs include phsycal self, moral ethical self, personal self, family self, and social self. In the realm of vocational education, self-concept is an important part of the development of student personality. As stated by some experts that the most important concept of personality is self (Malek, 2017; Stoszkowski and Collins, 2018; Stoszkowski *et al.*, 2018; Narayan, Cochrane and Herrington, 2019). The meaning of that is that the self always contains ideas, perceptions and values that include awareness about oneself. This is in line with the principle of competency quality needs in the era of industrial revolution 4.0 (Jose and Ramakrishna, 2018; Mahmood and Hussin, 2018; Ślusarczyk, 2018). The self-concept which in this study has components in the form of identity self, behavioural self, and judging self, is the most important aspect in the development of students. On another view, self-concept is defined as self-representation which includes self-identity, namely personal characteristics, experiences, roles, and social status.
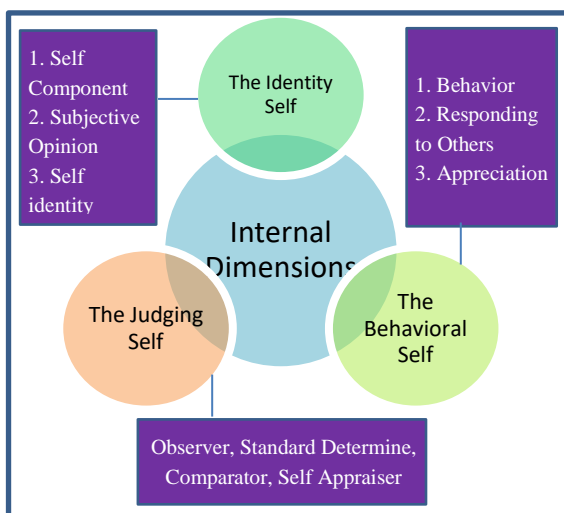
In the internal dimension, self-concept has a role that is to unite the relationship between attitudes and beliefs about oneself. In addition, self-concept is a dynamic and complex system of beliefs that a person has about him, including attitudes, feelings, perceptions, values and unique behavior of the individual (Lang *et al.*, 2017; Forster and Bol, 2018; Newton *et al.*, 2018; Haris *et al.*, 2019). That is actually the competency needed by vocational students in facing this IR 4.0 era. Self-concept includes all individual views on their physical dimensions, personal characteristics, motivations, weaknesses, strengths or abilities, failures, and so on. A positive Self-concept can be equated with positive self-evaluation, positive self-esteem, and positive self-acceptance. Some experts revealed that there are still quite a number of vocational students who still have negative Self-concepts such as negative self-evaluation, self-hatred, feelings of inferiority and lack of feelings of personal respect and self-acceptance (Loeb and Gustavsson, 2018; Yousaf, Ashfaq and Ahmad, 2018; Haris *et al.*, 2019; Lin, 2019).

In addition to the internal dimensions, this study also reveals the need for Self-concepts on the external dimension, which includes needs including phsycal self, moral ethical self, personal self, family self, and social self. The self-concept possessed by a student is not formed instantaneously but with an innovative learning process. Self-concept originates and develops in line with the growth of attitudes and behaviour of students, especially as a result of individual relationships with other individuals (Richardson, Mcgowan and Styger, 2017; Marcut and Chisiu, 2018; Stoszkowski *et al.*, 2018). Some experts state that in essence, when individuals are born, individuals do not have knowledge about themselves, do not have hopes that they want to achieve and do not have an assessment of themselves (Bacca, Baldiris and Girona, 2018; Jossberger *et al.*, 2018; Kintu, Kitainge and Ferej, 2019; Smirnova *et al.*, 2019). But over time, individuals begin to be able to distinguish between themselves, other people and objects around them and eventually individuals begin to know who they are, what they want and can make an assessment of themselves.

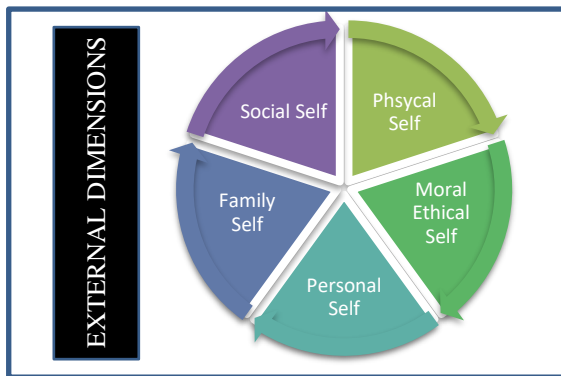Figure 6: The internal dimensions of self-concept needs

Figure 7: The external dimensions of Self-concept needs

In this IR 4.0 era, the self-concept of vocational students was formed along with its activities through the learning process (Mudin *et al.*, 2018; Santos *et al.*, 2018; Ślusarczyk, 2018). The source of information in the development of self-concept is most dominant through the interaction of individuals with others, namely parents, peers and society. The learning process carried out by individuals in the formation of their own concepts is obtained by looking at the reactions of others to the actions they have made, comparing themselves with others, fulfilling the expectations of others for the role they play and identifying the people they admire. In the IR 4.0 era the development of self-concept was hierarchical which included primary self-concept and secondary self-concept (Mahmood and Hussin, 2018; Idris, 2019; Mukri and Anwar, 2019; Philbeck and Davis, 2019).

The most basic concept is primary self-concept. Primer Self-concepts are formed as a result of classroom learning experiences through interaction with the educational community. The initial concept of its role in life, ideals and responsibilities based on environmental education and parents. Some experts explain that primary Self-concepts include self-physical images and self-psychological images. The physical image of the self develops earlier than the self-psychological image. The physical image of the self is related to its physical state, while the psychological image of the self is based on its relationship with the environment.

4.2 Acceleration of Graduation Capability of Vocational Students in the Era of IR 4.0.

In this study reveals the components of the need for graduation capability. There are four main needs components in the graduation capability. These needs include speed in taking effective and appropriate actions, the ability to map the vision and mission of life, the ability to cooperate with everyone, and the ability to adapt to all conditions of the work environment.

The capability of vocational student graduates is very complex and holistic. This is due to the demands of the industrial world and the world of work that are constantly changing rapidly in accordance with technological developments (Forster and Bol, 2018; Kintu, Kitainge and Ferej, 2019; Smirnova *et al.*, 2019; Thunqvist, Tønder and Reegård, 2019). One of them is ability in the speed of decision making. Some experts stated that the need for labour in the era of industrial revolution 4.0 includes those who are intelligent, able to collaborate, and have the ability to make decisions quickly. This decision is effective and appropriate (Mudin *et al.*, 2018; Zaharah *et al.*, 2018; Dardiri, Irsyada and Sugandi, 2019; Zambon *et al.*, 2019). This is in accordance with the characteristics of the workforce in vocational education and IR 4.0 demands which are characterized by: (1) being ready to enter heterogeneous employment (2) being able to think quickly following each technological development, 3) emphasizing mastery of knowledge, skills, attitudes and values -values needed by the world of work; (4) have a "hands-on" level of thinking or work performance; (5) skilled in negotiating and binding colleagues; and 6) responsive and anticipatory towards technological progress.

Literally, in the era of IR 4.0, the world of work demands work because of the need for activities, freedom, power, social recognition and pleasure (Jose and Ramakrishna, 2018; Santos *et al.*, 2018; Ślusarczyk, 2018; Zabidin, Belayutham and Ibrahim, 2019). Therefore, graduates of vocational students must be able to be smart in reading opportunities and targets in the future. On the other hand, in this era of industrial revolution 4.0 people are encouraged to work because of three aspects, namely, material, working together, and identity (ego), so that the slightest opportunity must be used properly by graduates of vocational students (Cirp *et al.*, 2018; Jantan *et al.*, 2018; Mahmood and Hussin, 2018; Pieroni, Scarpato and Brilli, 2018; Zabidin, Belayutham and Ibrahim, 2019). In addition, this study also revealed that one of the important components of graduation capability is the ability to adapt to all conditions in the workplace. The work environment is often determined by the conditions needed to get the job done. Some of these environments are physical such as equipment and

machinery and a special place to work. Some of the environment is mental or personal, such as the type of employer relationship with subordinates. Whatever the type of environment, graduates of vocational fields must adapt to it.

In addition, the ability to cooperate cooperatively effectively is also the main demand for graduates of vocational fields. The IR 4.0 era is an era of innovation-collaboration (Yousaf, Ashfaq and Ahmad, 2018; Kintu, Kitainge and Ferej, 2019; Smirnova *et al.*, 2019; Thunqvist, Tønder and Reegård, 2019). The biggest challenge facing the world today, is how to form innovative collaboration, in creating new technologies and approaches that combine the physical, digital world, with fundamental ways that can change human behaviour. Industrial changes in the form of additive manufacturing, advanced materials, intelligent machinery, automatic machinery, and other technologies, ushered in a new era of physical production. At the same time, increasing connectivity and more sophisticated data collection and analytical capabilities made possible by IoT has led to a shift towards an information-based economy.

4.3 Increased Absorption of Graduates in the IR 4.0 Era

This research reveals five main efforts of universities to increase the absorption of graduates of vocational students. These efforts include the application of the synchronized curriculum of DU / DI needs, expansion of the number and quality of vocational education institutions, cooperation with graduate users, development of tracer studies, and improvement of student entrepreneurship programs (Yousaf, Ashfaq and Ahmad, 2018; Hashim *et al.*, 2019; Lin, 2019; Woessmann, 2019).

In the IR 4.0 era, the absorption of students from vocational graduates became a relatively serious problem. That is because of the shift of human labour with machine labour (intelligent systems). This can be addressed, one of which is through the development of a curriculum that is integrated with the needs of the business world and industry (DU/DI) (Forster and Bol, 2018; Haris *et al.*, 2019; Smirnova *et al.*, 2019; Thunqvist, Tønder and Reegård, 2019). In essence, graduates of vocational fields are specifically required to become graduates at the level of experts, ready to work, easily adapt to the environment and change, and be able to develop themselves according to the needs of the workforce. Curriculum as teaching material or list of subjects, namely all that is given or delivered by lecturers to

students. What is given or delivered can cover the entire contents of a subject, and it can also be the subject matter (certain topics) of the subject matter (Lu *et al.*, 2018; Elyakim *et al.*, 2019; Kong, 2019; Yeop *et al.*, 2019).

In vocational education, the curriculum is dynamic in the sense that the curriculum must be reviewed continuously. This is due to the educational paradigm which is required to produce quality graduates with programs that are in accordance with the demands of the world of work and industry. Conformity with the demands of the world of work is an important aspect in the vocational field curriculum. In this IR 4.0 era, if the curriculum is not in accordance with the needs of students and the needs of the community, it can be said that the curriculum has no benefits. The curriculum must be in accordance with the development of science, technological developments, demands of the times and anticipation of future trends (Al-samarraie, Teng and Alzahrani, 2017; Han and Ellis, 2019; Leeuwen *et al.*, 2019; Montgomery *et al.*, 2019). Basically, curriculum changes can be made if on the basis of recommendations from the results of the assessment stating that the implementation of the curriculum is considered failed to achieve its objectives.

Vocational education must always adjust to the needs of the community, especially the needs of the industry. Colleges managing vocational education must collaborate with the industrial world and the business world as graduates (Lang *et al.*, 2017; Journal and Journal, 2018; Lin, 2019). In essence, vocational education must be designed so that graduates have the skills, abilities, knowledge, attitudes, and work habits that are in accordance with the needs of the workforce. Higher education as a final level educational institution that aims to produce graduates who have national standard knowledge, skills, attitudes and attitudes that are in line with the IR 4.0 era (Jani *et al.*, 2018; Chan, 2019; Elyakim *et al.*, 2019; Srinivasan *et al.*, 2019).

The development of tertiary institutions is a shared responsibility between educational institutions as providers of education, the community as the target of education, and industry as users of graduate work. vocational education curriculum (Forster and Bol, 2018; Karlsson, Nilsson and Nilsson, 2018; Lin, 2019). In the past, the vocational education system used a supply-driven approach, so now the curriculum has been adjusted to be demand-driven so that the business world and industry (DUDI) are increasingly actively involved in the process of vocational education in higher education managing vocational education.

4   CONCLUSIONS

Conclusions from this study indicate that: (1) the need for self-concept in the era of IR 4.0 in vocational students includes internal dimensions (the identity self, the behavioural self, the judging self), and external dimensions (phsycal self, moral ethical self, personal self, family self, social self); (2) the need for graduation capability in the era of IR 4.0 in vocational students includes speed in taking effective and appropriate actions, the ability to map the vision and mission of life, the ability to cooperate with everyone, being able to adapt to all conditions of the work environment; and (3) higher education efforts in the field of vocational education to increase the absorption of graduates of vocational fields including the application of synchronized curriculum needs of DU / DI, expansion of the number and quality of vocational education institutions, cooperation with graduate users, development of tracer studies, and improvement of student entrepreneurship.

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